HUMAN MONSTROSITIES

BARTON COOKE HIRST

GEORGE A. PIERSOL

PART IV.

No. .....

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HUMAN

MONSTROSITIES.

BY

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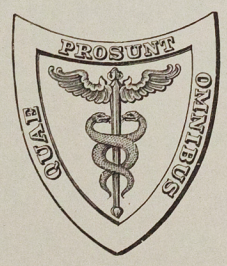
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PART IV.

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PART IV.

DESCRIPTION OF MALFORMATIONS

(*Continued*).

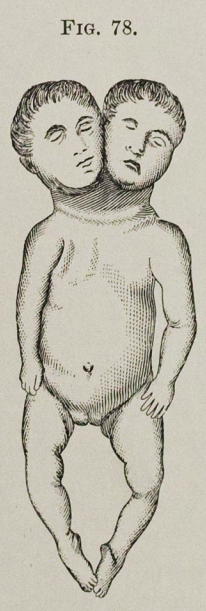
DESCRIPTION OF MALFORMATIONS.

MONSTROSITIES.

COMPOSITE MONSTERS—*Continued.*

DICEPHALUS (*Xiphodymus; Atlodymus; Derodymus; Psodymus; Hepatodymus.*)—The Dicephali have two distinct heads, usually with separate necks. In those with the least-marked

FIG. 78.



Dicephalus dibrachius monauchenos.

FIG. 79.

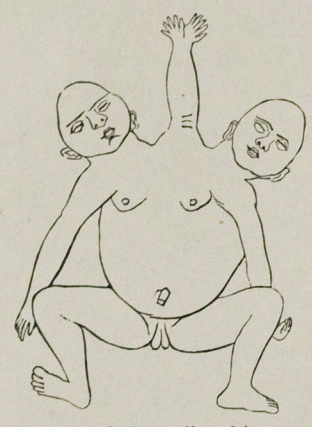


Dicephalus dibrachius diauchenos.

fission of the upper body the duplicity apparently ends at the shoulders. There are two arms, one trunk, two legs. But even in these specimens, dissection will show a double spinal column,

usually to the sacra (Plates XXX. and XXXI.). The individual specimens of this monstrosity may show different degrees in the separation of the upper trunk, but the spinal columns always converge toward the sacra, and do not possess the same axis, as they do in the ischiopagic monsters. Dicephalus, therefore, is the condition intervening between diprosopus and ischiopagus, merging from one into the other.

FIG. 80.



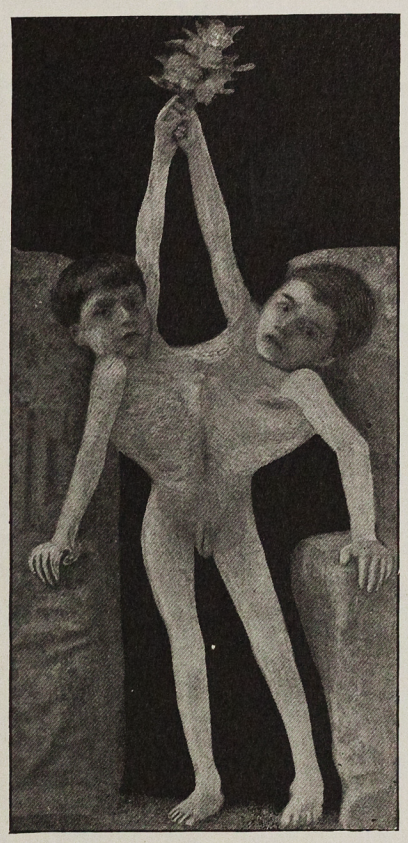
Dicephalus tribrachius.

With the divergence of the trunk is seen a development of three and four upper extremities, and, finally, of a third lower extremity, shorter than the others, not so well formed, and showing some duplicity (Plates XXXII. and XXXIII.) To conveniently designate and separate the different degrees of dicephalus, Förster and Fisher employ the following classification:

Dicephalus dibrachius { monauchenos. / diauchenos.
Dicephalus tribrachius dipus.
Dicephalus tribrachius tripus.
Dicephalus tetrabrachius dipus.
Dicephalus tetrabrachius tripus.

In the interior organs there is found a degree of duplicity corresponding to the separation of the trunks. In the first division, most of the viscera will be apparently single, but the right and left halves will be furnished by the respective fœtuses. A transposition of the organs will be found when necessary for

FIG. 81.



Dicephalus tetrabrachius (the Tocci boys).

a symmetrical arrangement, as in the stomachs. Thus in one specimen the right auricle and ventricle of the heart belong to the right fœtus, the left to the other, but there is an intermediate rudimentary development of auricle and ventricle belonging to both. There are three lungs, the middle possessing five

lobes. The stomach is double, the pyloric ends pointing toward one another; and the small intestine, for the greater part of its course, is a double tube, fusing into a common canal near the lower end of the ileum. The colon is single, but twice the natural length. The liver possesses two gall-bladders; there are two pancreases, two large kidneys and a small intermediate one,

FIG. 82.



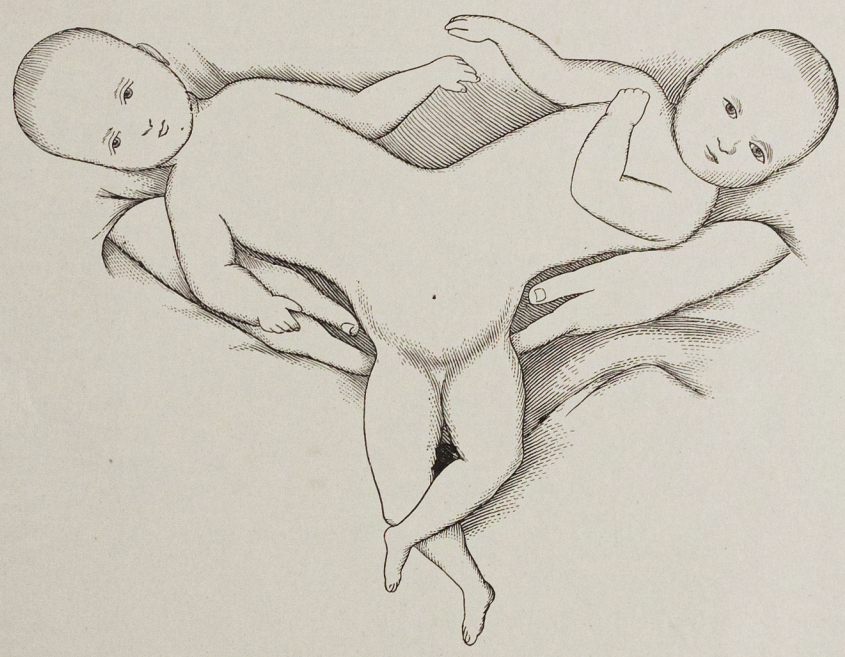
Dicephalus tetrabrachius (Rita-Christina).

and two aortic trunks. The urinary bladder is single, and, as in almost all dicephali, the external genitalia show no duplicity. As in all degrees of this monster, there is a single umbilicus and one cord.[1]

[1] This is the anatomical description of the specimen represented in Plates XXX. and XXXI.

In the highest degree of dicephalus, tetrabrachius dipus and tripus, there is a pretty complete duplication of the internal organs, and the two halves of the composite body are distinct individuals in thought, volition, and disposition; and each brain controls the movements of the corresponding half, only, of the body. There are four lungs; two hearts, perhaps in one pericardium; two stomachs; two intestinal canals to the colon, or

FIG. 83.



Dicephalus tetrabrachius (Marie-Rose).

even to the rectum; two livers, though they may be joined, and two gall-bladders. There may be four kidneys, but more likely three, in which case the intermediate organ is small, although showing, perhaps, signs of duplicity. In the female the uterus is double, but the external genitalia are single. In the male the two bladders are emptied at different times through a common penis. There are two complete spinal columns, the

coccyges converge toward one another and the sacra are united by bony union. Above this junction are two small nates with a cleft between, and in this situation may be found a rudimentary third lower extremity. Between and below the coccyges is the single anus. The two lower limbs have no coördinate

FIG. 84.



Dicephalus tetrabrachius (Justina-Dorothea).

action, each being subject to the will of the corresponding individual. Hence locomotion is awkward, or almost impossible.[1]

Dicephalus is said to be a common form of double monster. Förster found 140 among 500 specimens investigated: 60 were females, 34 males; of 46 the sex was not given.

Frequently, in a comparative sense, as such monstrosities are born, it is very rare for them to be born alive, or to survive the first few days. The Scotch brothers alone reached

[1] This anatomical description applies to two famous examples, Rita-Christina and the Tocci boys.

adult life, and since the date of their death, 1518, the Tocci boys furnish the only example of long-continued existence. (Harris.)

The following are the best-known instances of dicephali living for any length of time:[1]

I. *Peter and Paul, of Florence.* 1316. Lived thirty days.

II. *The Scotch Brothers.* 1490. Lived twenty-eight years.

III. *The Würtemberg Sisters.* 1498.

IV. *Justina-Dorothea.* 1627. Lived six weeks.

V. *The Padua Boys.* 1691. Lived only long enough to be baptized.

VI. *Rita-Christina.* 1829. Lived eight months and eleven days. Rita died of bronchitis, and Christina's death followed immediately.

VII. *Marie-Rose Drouin.* 1878–79. Lived seventeen months. Death caused by cholera infantum in Marie. They were born in St. Benoit, Canada. At birth their bodies were joined at an angle of 120 degrees, but came closer together as they grew older. Labor lasted seven hours. The head and body of one child were born, then the legs, and finally the body and head of the other infant.

VIII. *The Tocci Boys.* Born at Locana, Italy, on October 4, 1877. Their mother was a healthy primipara, who has since borne normal children. The labor lasted eight hours, and was easy. The head of the right twin presented first in an occipito-anterior position, the head of the left twin being delivered directly afterward. The right boy was christened Giovanni Battista, the left Giacomo.

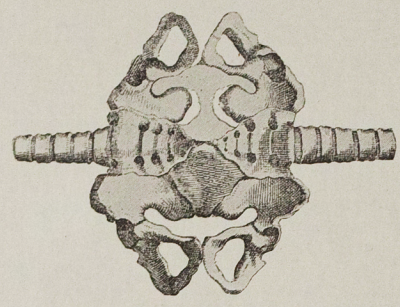
These boys are at the present time in good health, and there is no reason why they should not live a long time. Their

[1] We are indebted for this list mainly to Dr. R. P. Harris (American Journal of Obstetrics, April, 1892).

photograph (Fig. 81) was given us after a very superficial examination allowed by the parents.[1]

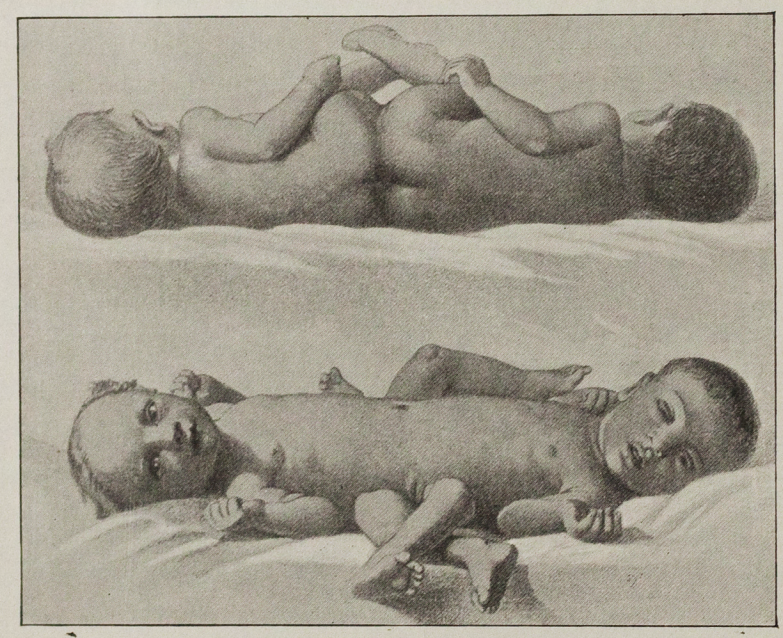
ISCHIOPAGUS.—The two bodies in ischiopagus are joined by

FIG. 85.



The junction of the pelves in ischiopagus.

FIG. 86.



Ischiopagus tetrapus. (HUFF.)

[1] For a full description of them, and of their analogues, see Harris, *loc. cit.*

the coccyges and sacra. The spinal columns have about the same axis. The composite pelvis is composed of the four innominate bones, by the junction of the right pubic bone of one infant to the left pubic bone of the other on one side, and the left to the right on the other. The two bodies are distinct and separate, each possessing its normal parts and organs, but the pelvic viscera are likely to be fused, and the external genitalia lying between the limbs on each side of the pelvic

FIG. 87.

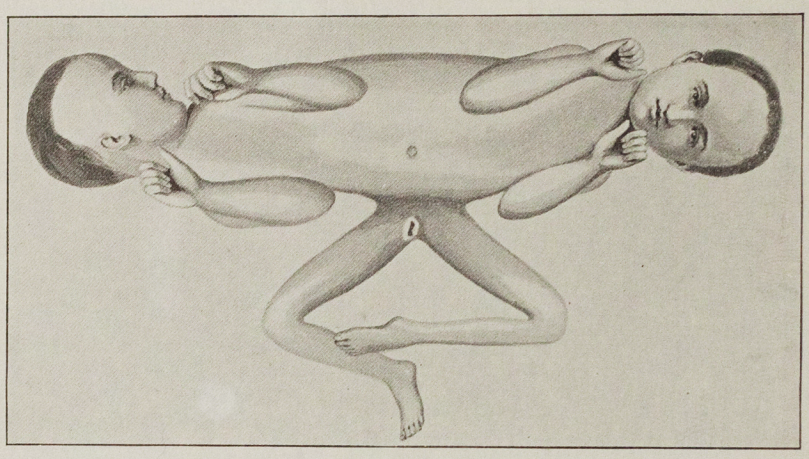


Ischiopagus tripus. (Mütter Museum, College of Physicians of Philadelphia.)

region are composed of the right half of one infant's genitalia and the left half of the other. Thus, in the female, the right and left labia majora belong not to one individual, but one to each. So with the two halves of the penis and scrotum, although the symmetrical and normal appearance of the parts would not suggest their dual ownership. The lower limbs, also, on each side, although symmetrical in appearance, and lying naturally together, are supplied on the right and left sides by the corresponding bodies. The lower limbs are not usually

equally well developed, but even so they are symmetrical. Thus on one side there will be two well-formed legs each belonging to a separate body, and on the other the two limbs will be fused into a single ill-developed one (ischiopagus tripus). (Fig. 87.) In this case the genitalia are, of course, lacking on the ill-developed side. In other specimens there will be two legs on one side, none on the other (ischiopagus dipus). (Fig. 88.)

FIG. 88.



Ischiopagus dipus.

In many specimens there is atresia of the urethra and anus, at least on one side, and very likely on both. It is mainly on this account that the ischiopagi do not long survive birth. In exceptional cases there seems to be no reason why long-continued existence is impossible; but, as a matter of fact, we know of but one ischiopagus which lived beyond the first year. Fig. 87 represents the plaster cast of a child that died when thirteen months old.

The delivery of these infants is usually easy. The head, shoulders, and trunk of one child are born; then the legs of

both; and, last, the trunk, shoulders, and head of the remaining infant. There is only one cord and one umbilicus.

Ischiopagus is not very rare. Twenty cases were collected by Förster, Ahlfeld adds a number of others, and there are nine references to the subject in the *Index Medicus* since 1879.

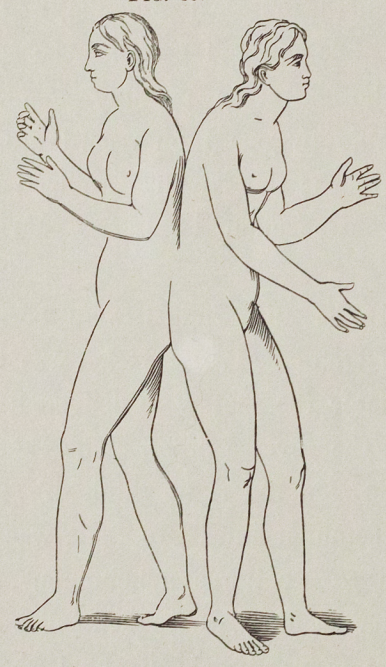
Pygopagus.[1]—In this extremely rare variety of double monster the bodies are joined only by the latero-posterior aspects of the sacra and coccyges, so that the two individuals are placed almost back to back. Each one of the twins is possessed of a perfectly well formed and independent body and organs, except the lower rectum, the external genitalia, and the large bloodvessels of the lower abdomen and pelvis. The spinal cords may be confluent in the sacra, or possibly somewhat higher up. The most remarkable pygopagi on record are the Hungarian sisters, Helen and Judith; the North Carolina twins, Millie and Christine; and the Bohemian twins, Rosalie and Josepha Blazek.

The Hungarian Sisters.—Helen and Judith were born in Szony, Hungary, on the 26th of October, 1701. Helen was born first to the navel; three hours later the feet were delivered, and the body of Judith followed in the reverse order. The children were united at the sacrum. Between the right thigh of Helen and the left of Judith was the common anus. In front was the common vulva. The inclination to stool was synchronous, but urination was separate, the latter leading to frequent disputes. In their sixth year Judith became paralyzed on the left side, and although she recovered, remained permanently enfeebled, and, in contrast with her sister, backward in strength and development. The two had smallpox and measles together, but Judith was subject to nervous affections, from which Helen was free.

[1] πυγή, the nates, and πάγω, I fasten.

Helen had at one time an attack of pleurisy; Judith, at another, malaria. Menstruation began in the sixteenth year, but the menstrual flow came on at different times, and in varying quantities, in the two girls. On the 8th of February, 1723, Judith was seized with convulsions and became comatose. Helen then developed fever and was shortly in a condition of collapse. On the 23d of the same month the death-struggle began with Helen three minutes before it appeared in Judith. Their death took place in the Ursuline Convent at Presburg, where they

FIG. 89.



The Hungarian sisters.

FIG. 90.



The genitalia of the Hungarian sisters.

had been domiciled since their ninth year. At the post-mortem examination it was found that the aortæ and venæ cavæ, at the region of the former's bifurcation, were fused. There was a common rectum and anus. The sacra were united at the second vertebra; below there was a single sacrum and coccyx. There

were two vaginæ opening into a common vulvar orifice. Each body had its own clitoris, nymphæ, and urethra. A Hungarian physician composed a Latin poem as an inscription for a bronze statuette of the "Wonderful Sisters," of which Fisher has made the following apt translation:

"Two sisters wonderful behold, who thus have grown as one
That nought their bodies can divide, no pow'r beneath the sun.
The town of Szœnii gave them birth, hard by far-famed Komorn,
Which noble fort may all the arts of Turkish sultans scorn.
Lucina—woman's gentle friend—did Helen first receive,
And Judith, when three hours had passed, her mother's womb did leave.
One urine passage serves for both; one anus, so they tell;
The other parts their numbers keep and serve their owners well.
Their parents poor did send them forth, the world to travel through,
That this great wonder of the age should not be hid from view.
The inner parts concealed do lie, hid from our eyes, alas!
But all the body here you view, erect in solid brass."

The North Carolina Twins.—Millie and Christine were born in July, 1851. The labor was easy. The parents were negroes or half-breeds. The junction was from the lower end of the first sacral vertebra to the coccyx, but the union is rather lateral, so that they can kiss each other. There is a common anus, and a depression representing a second one. Each must have a separate rectum, however, for defecation is not synchronous, and a purgative given to one does not affect the other. There are two vaginæ and two urethræ, the labia, however, joining at their posterior extremities, so as to give the appearance of a single vulva. Menstruation occurs at the same time in both. There is probably a communication between the lumbar cords, for one can tell when the other is touched on the lower extremities, although she cannot say where. Likewise, when one girl moves her leg the other knows of it, although

she cannot say which leg is moved. These women, now in middle age, are still alive.

The Bohemian Twins.—Rosalie and Josepha Blazek were born on the 20th of January, 1878, in Skreychov, Bohemia. The junction is latero-posterior, involving the whole of the sacra and perhaps the lower lumbar vertebræ, so that one may speak of an anterior and a posterior side of each body. Rosalie is the

FIG. 91.

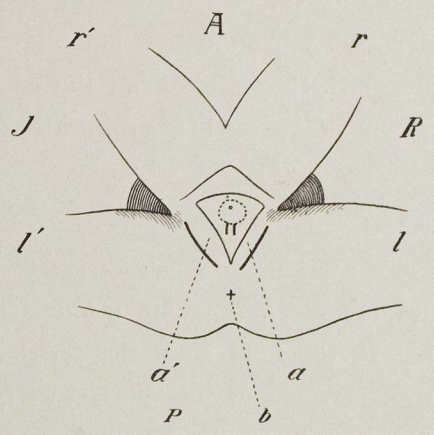


The North Carolina twins.

left, Josepha the right twin. The two anterior legs are much closer together than the posterior. In walking, the two anterior limbs are moved forward with the outer sides of the feet first. The posterior limbs are then advanced with the inner sides of the feet first. In this way rapid locomotion, even a quick run, is possible. Often, however, Rosalie, the stronger child, walks naturally forward, drawing her sister after her, who must, of

course, walk backward. There is a common urethra and a common anus, but two vaginæ. There is either a common clitoris or else the two are very near together, and the rudimentary labia minora are fused. As far as we know, there has been no thorough examination of these girls. Breisky made the first when they were six months old. At the time of their birth the mother was twenty-two years old. She had given

FIG. 92.



The genitalia of the Bohemian sisters. (MARCHAND.)

R. Rosalie. *J.* Josepha. *A.* Anterior side. *P.* Posterior side. *r*, *l.* Right and left thigh of Rosalie. *r′*, *l′*. Right and left thigh of Josepha. *a.* Left labium of Rosalie. *a′*. Right labium of Josepha. *b.* Common anus; in front of it the two vaginal entrances and the external meatus. The dotted line represents the probable position of the labia minora. The right labium of Rosalie and the left of Josepha are fused.

birth, two years before, to a healthy girl. Rosalie presented first, by the head, and was delivered as far as the abdomen, when further progress was impeded. The midwife, by a vigorous pull, then delivered the feet of both children, and finally the body and head of Josepha, which came last.

Other pygopagi worthy of note are as follows (Ahlfeld):

Two male children, united at the sacrum, born in 1818. The single scrotum was unusually large and contained four testicles.

Two females, united at the sacrum, born in 1700. An attempt was made by a surgeon in Vienna to cut the two apart, but the operation proved fatal to both.

Two females, born in 1826. The umbilical cords united a short distance from the body, and were inserted in a single placenta, in this being an exception to the general rule, that each child has its own cord and placenta, although there is, of course, but a single amniotic cavity.

Two females, still-born, at Mazères, in 1869. The vagina was single. Post-mortem examination not allowed.

It will be observed that almost all the examples described are females. The sex of the twins, as in all double monsters, is, of course, invariably the same.

With the description of pygopagus ends the study of the terata katadidyma (Förster), or double monsters divided from above downward.[1] In the next class the division is from below upward.

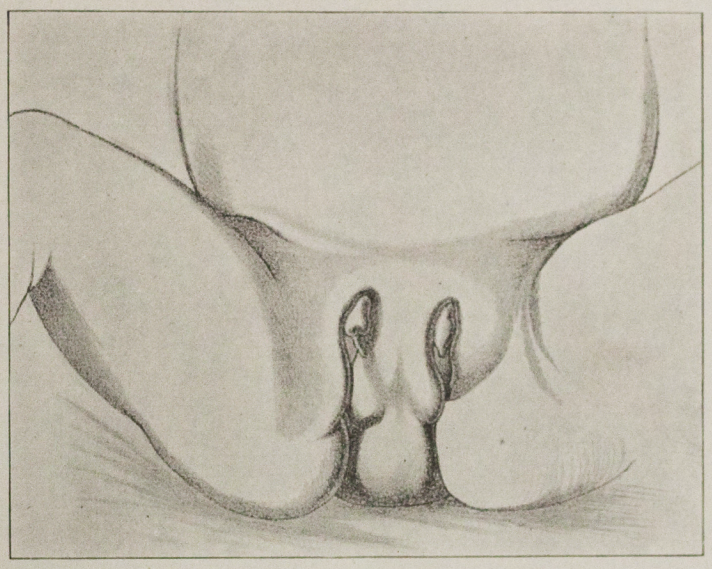
Terata Anadidyma.

Dipygus.—This term signifies a duplicity of the pelvis, the pelvic extremities, and the genitalia. A typical dipygus with two equally developed pairs of legs is unknown. If four legs exist, the two inner limbs are ill-developed, as in one specimen (Ahlfeld); or one of them is a mere stump, as in Blanche Dumas; or the duplicity is confined to the pelvis and genitalia, as in Katharine Kaufmann. The last named was born in 1876. She possessed two well-marked sets of external genitalia, sepa-

[1] We think it more convenient to study all parasitic forms under a separate general heading, as the external appearances of the symmetrical and asymmetrical double monsters differ so radically.

rated from one another by the raphe. There were on each side two greater and two lesser labia, a clitoris, hymen, urethra, vagina, and anus. The child died in 1878. At the post-mortem examination it was found that the pelvis was divided

FIG. 93.



Genitalia of Katharine Kaufmann. (AHLFELD'S Atlas.)

by a sagittal fold of peritoneum. In each half was a bladder and a unicorn uterus, with corresponding tube and ovary. The colons were double to the cæcum. There were but two kidneys. The recta opened into the right vagina and the left vulva. The spinal column was double below the third lumbar vertebra.

Blanche Dumas was born in 1860. The pelvis, later in life, was so broad that a pelvimeter could not span it. On the left side the left, on the right side the right leg was well developed. Between these, the left of the inner limbs was quite well formed,

but the right was a mere stump. The supernumerary limb is fastened to the symphysis without a joint and cannot be moved except passively. Between each pair of legs are the openings of the bowel, bladder, and genitalia. Menstruation is said to

FIG. 94.



Blanche Dumas.

occur from both genital passages at once. At the junction of the rudimentary limb with the body in front is a mammary gland with a nipple.

Mrs. B. is perhaps the most perfect example of symmetrical dipygus yet described. She was born in 1868, and is still alive and healthy. The duplicity begins, as may be seen in the illustration, just above the waist. The spinal column divides at the third lumbar vertebra. Everything below this is double. Micturition and defecation occur at different times

on the two sides. Menstruation occurs simultaneously. She was married in her nineteenth year, and a year later was found

FIG. 95.



Mrs. B. (WELLS.)

to be pregnant on the left side. Abortion was induced in the fourth month, on account of exaggerated vomiting and from the fear that labor might be impossible at term.[1]

[1] Wells: "A Unique Monstrosity." American Journal of Obstetrics, 1888, p. 1266.

Syncephalus (*Janus; Janiceps; Synote*).—In this species the division of the lower body is more marked than in the preceding variety, extending completely to the navel, and less

Fig. 96.



Syncephalus. (Presented to the Wistar and Horner Museum by Dr. George Cooke.)

completely to the head, which, however, also shows signs of its duplex formation. The bodies are joined front to front. The faces are turned laterally and are made up of the right side of

one face and the left of the other. Usually but one face is well formed, the other showing a pair of ears close together, and perhaps the proboscis of a cyclops (Janiceps asymettros).

Fig. 97.

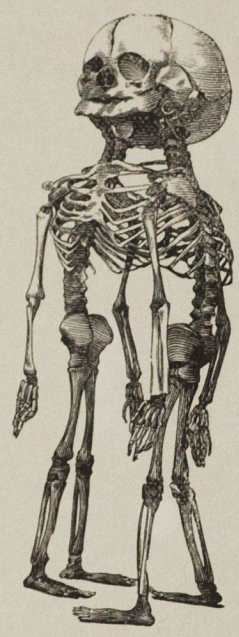


Syncephalus. (Presented to the Wistar and Horner Museum by Dr. George Cooke.)

Each child possesses its own occipital region. The brain shows some evidence of duplicity, at least of the medulla oblongata, the cerebellum, the pons, and the corpora quadrigemina. Very

rarely a symmetrical Janiceps may be seen with equally well developed faces. There is always a single umbilical cord. A syncephalus lives at most but a few hours. Craniotomy may be necessary on account of the large composite head. Janiceps asymmetros is not a very uncommon form of monstrosity.

FIG. 98.



Skeleton of syncephalus. (Mütter Museum, College of Physicians.)

FIG. 99.



Symmetrical Janiceps. (BORDENAVE.)

CRANIOPAGUS.—In this form of double monster the two bodies are joined at some homologous portions of their cranial vaults. The junction very rarely involves the brains, but is confined to the skull and scalp. The longitudinal axes of the two bodies are not always parallel, as in thoracopagus, but the pelvic extremities may diverge from one another. Three divisions are made of this class: Craniopagus frontalis; Craniopagus parietalis; Craniopagus occipitalis.

Craniopagus Frontalis.—According to Ahlfeld there have been but two examples in the human race: two girls, born in 1495; and two fœtuses, at about the eighth month of intra-uterine development, in the Anatomical Museum at St. Petersburg. The former lived to be ten years old, when one died, and was immediately separated from the other; which, however, also died, either from the surgical operation or in consequence of the sister's death. These two were joined front to front, so

FIG. 100.



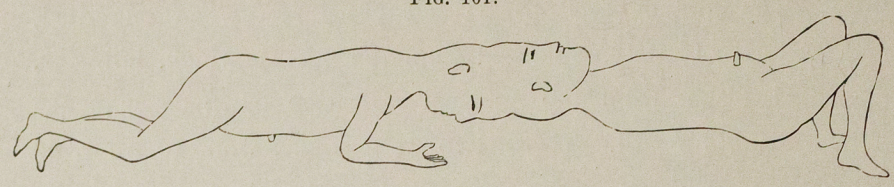
Craniopagus frontalis. (VON BAER.)

that when one walked forward the other was compelled to walk backward. The noses almost touched and the eyes were directed laterally.

The two fœtuses in the St. Petersburg Museum were joined by the right sides of the foreheads. The right eyes were directed toward one another; with the left they might have looked about them. The junction of the foreheads extended from the upper borders almost to the roots of the noses. The right hemispheres of the brain were confluent through an opening in the frontal bones.

Craniopagus Parietalis.—The junction of two individuals by the parietal bones is more frequently seen, but is still very rare. The skulls are united by the parietal bones, in the manner

FIG. 101.



Craniopagus parietalis.

shown in Fig. 101. The heads are twisted on one another to varying degrees. In the illustration the rotation is complete, so that the faces look in opposite directions. In other speci-

FIG. 102.



Craniopagus parietalis.

FIG. 103.



Craniopagus occipitalis. (BARKOW.)

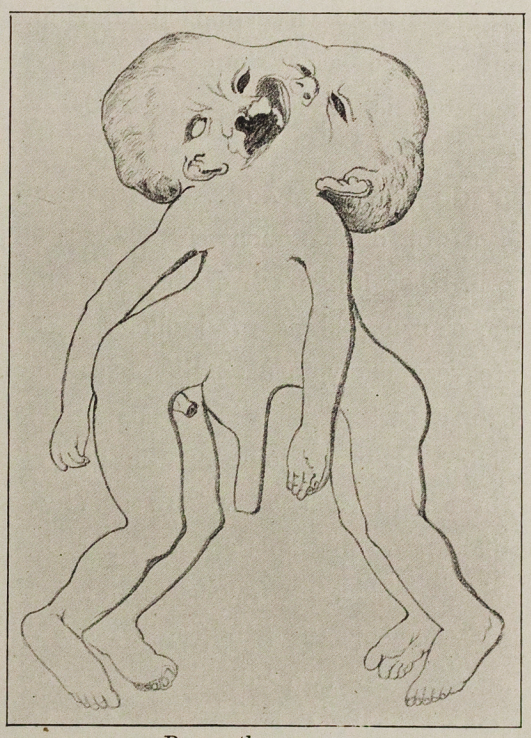
mens the faces may look in the same direction, or diverge at all angles up to 180 degrees. Ahlfeld describes twelve examples, of which number seven lived for some time after birth.

Craniopagus Occipitalis.—The junction of the two bodies is found at the occipital region very rarely, so that the two backs are turned squarely toward one another. More often the union is rather lateral. Ahlfeld describes five authentic examples, and two more that are doubtful. Two males, joined by the backs of their heads, born in 1700, are said to have been alive at ten years of age.

Terata Anakatadidyma.

In this division there is a separation of the upper and lower bodies, the junction being confined to the region from the

Fig. 104.



Prosopothoracopagus.

umbilicus to the head. If the heads are quite free from one another, and the junction involves the abdomen and thorax,

from the umbilicus to the top of the sternum, the specimen is known as thoracopagus, or sternopagus. If the junction is still more limited in area, reaching only from the umbilicus to the ensiform cartilage, the joined twins are described as a xiphopagus, or, as we shall call them here, omphalopagus—a term, we believe, more distinctive of the true condition. The word rhachipagus may be used to describe twins joined back to back by any portion of the spinal column.

Prosopothoracopagus.—The twins are united by the upper abdomen, the chest, and the faces, but the spinal columns are quite separate and distinct. The faces are imperfectly developed; the jaws united. The neck is single, but broader than normal. There is a single œsophagus, stomach, and duodenum. The lungs are double. The heart shows signs of duplicity. This variety of monster is decidedly rare. Extra-uterine life is impossible.

Thoracopagus; Sternopagus.—Sternopagus is one of the commonest forms of double monster.[1] The thoracic cavity is common to both. The lungs are double, but the heart is often a single organ, showing signs of duplicity. If there are two hearts, they are very likely in a single pericardium. The intestinal tract is, for a part of its course, common to both. There are two livers, but they are joined. The genitalia are distinct and separate, a set to each body. In some cases the spinal axes converge toward one another above, and the bodies are placed more side to side. In such specimens the neighboring arms are fused—thoracopagus tribrachius. The spinal axes may converge below and the two adjoining legs be fused—thoracopagus tripus. Usually the thoracopagi are born dead, in

[1] Plates XXXIV.–XXXVII., under the generic term omphalopagus, show examples of this common form.

consequence of their difficult birth. If born alive, they do not long survive, chiefly on account of defective heart development.

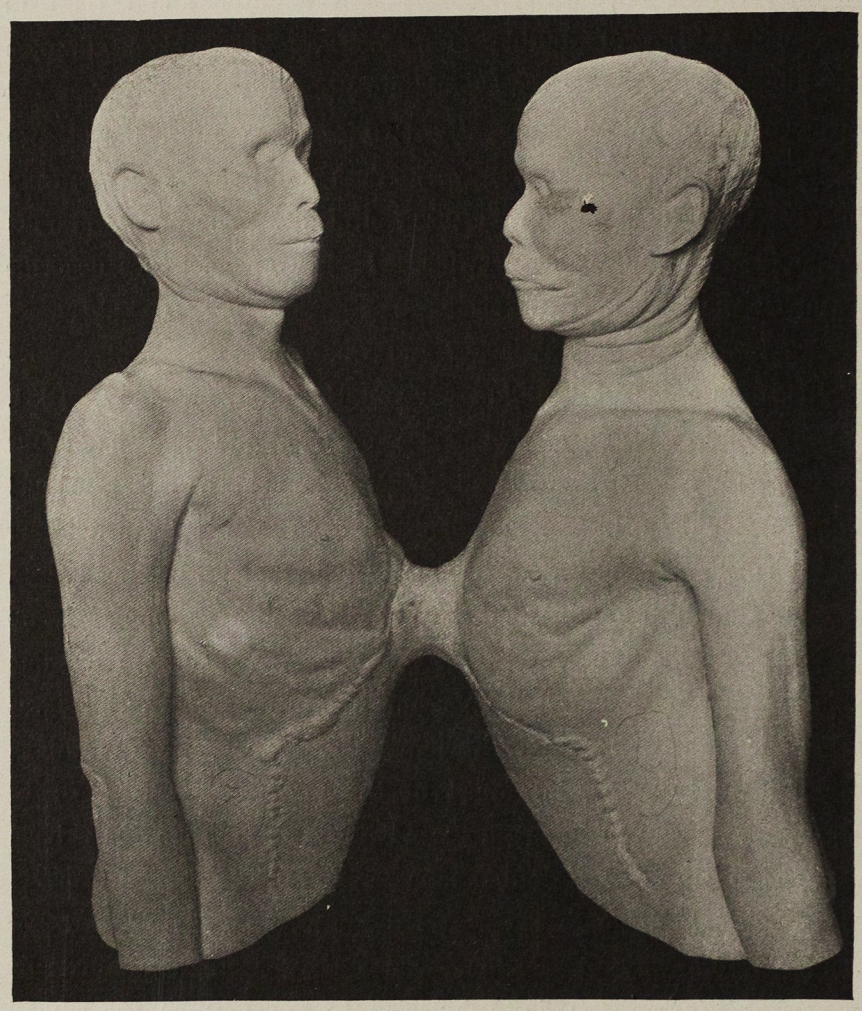
OMPHALOPAGUS; XIPHOPAGUS.—The xiphopagi are united from the umbilicus to the xiphoid cartilage. There are two distinct individuals, with a looser and slighter union than in any other form of double monstrosity. There is a common umbilicus and a single cord containing possibly four arteries and two veins, but more frequently two or three arteries and two veins. Xiphopagi are not very rare, but they very rarely survive their birth, which is often difficult. The most famous example were the Siamese twins. It is convenient to describe them as the type of their class.

The Siamese Twins.—Eng and Chang were born of Siamo-Chinese parents, at Meklong, near Bangkok, in May, 1811. The mother was thirty-five years of age, and had had four daughters prior to the birth of the joined twins. She had fourteen children in all, ten of them being twin births. Eng and Chang were delivered, the one feet first, the other head first, without much difficulty, as they were small. In boyhood, up to ten or twelve years of age, the boys were able to assume this relative position while playing upon the floor. Eng was upon the right, Chang on the left. The former was the taller, stronger, and better developed of the two. They lived to be sixty-three years old—a more advanced age than has been attained by any other double monster.

In 1829, at eighteen years of age, they left Siam for England by way of Boston, where they were examined by Professor Warren, the first physician to report upon their bond of union. After a short stay in this country they sailed for England, but soon returned and settled upon a farm in North Carolina, assuming the family name of Bunker. A second trip to Europe was made in 1835, and a third in 1869.

Their separation by an operation was often discussed, especially during their last visit to Europe, but it is doubtful if they ever really desired it, or would have consented to it,

FIG. 105.



Photograph of cast in the Mütter Museum of the College of Physicians.

although, after a bitter quarrel, in a moment of passion, they once made the request of their family physician. The two brothers were not symmetrically developed, the inner sides of

the bodies inclining toward one another, and being less well developed than the outer sides. Thus the outer legs and arms were stronger than the inner; the opposed chest surfaces were absolutely flat, the outer halves showing a compensatory fulness. The outer eyes, from their oblique direction, had imperfect vision, and Chang had a marked lateral curvature of the spine, bending his chest to the left.

The twins were married in April, 1843, and raised large families. Chang had ten, Eng twelve children, all of them normal except two of Chang's, who were deaf-mutes. They lived upon two farms a mile and a half apart, and spent three days in each home alternately. While Chang was in his own house for the stipulated period he was entire master; the other followed his directions implicitly, and could only remonstrate if he did not approve of what was done. Late in life Chang became something of a drunkard, and three years before his death was stricken with hemiplegia of the right side, from which he never entirely recovered.

On January 12, 1874, Chang developed, while at his own house, a bronchitis. On the evening of the 15th, in pursuance of their custom, the twins insisted on leaving Chang's house for Eng's. The weather was cold, and they drove in an open carriage. On the following evening Chang complained of thoracic oppression and inability to lie down with comfort. They passed a restless night, but finally fell asleep. Near daybreak, Eng called to one of his sons to come and waken Chang. The boy, as soon as he reached Chang's side, called out, "Uncle Chang is dead!" Eng at once said, "Then I am going." He desired Chang's body to be moved closer to him, and in a little while requested that his limbs be moved. He then endeavored to micturate several times, but voided only a few drops of urine. Feeling choked, he asked to be raised in bed. He remained

rational almost to the last, until syncope appeared, and death ensued quietly a little more than two hours after he had learned of his brother's death.

The autopsy was begun in Eng's house, February 1, 1874, and finished in the Mütter Museum of the College of Physicians of Philadelphia, fifteen days after death. No preservative had been used, but, as the weather was cold, the bodies remained in fairly good condition and stood the transportation of about four hundred miles well. The bond of union originally joined the twins face to face, and their lateral juxtaposition was evidently acquired. The autopsy was conducted, as far as possible, in the former position. The bond was broader above than below, and had a circumference of nine inches. Its upper surface measured two and one-half inches in width at its base toward Eng, two and one-third inches at its base toward Chang, and two inches in the middle. The vertical depth was three and one-quarter inches, the length of the upper surface one and one-third inches, of the lower almost three inches.

An incision was made in the "posterior" surface of the bond, as the family had exacted a promise that there should be no visible disfigurement of the bodies as they lay upon their backs. The constituent parts of the bond, in addition to skin, fat, connective tissue, and aponeuroses of external oblique and pectoral muscles, were as follows:

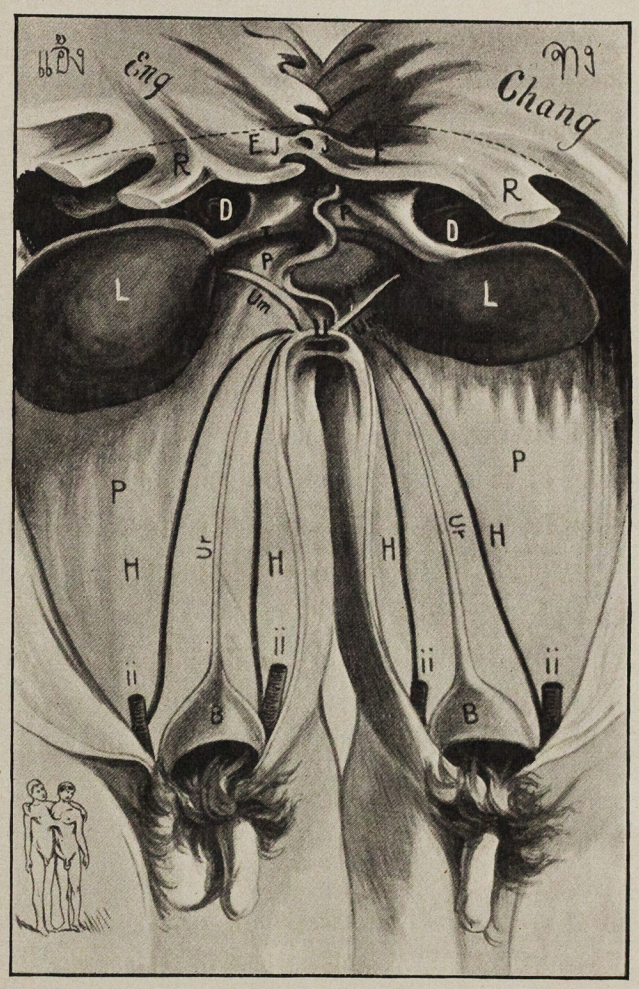
Two pouches of peritoneum on each side, an hepatic and umbilical, separated by a median septum running vertically.

A process of liver tissue, three inches long, six lines wide, and three lines thick, arising from the same point in each liver, namely, directly above the longitudinal fissure, having more fulness on the side of the right than on that of the left lobes.

The following bloodvessels: A terminal branch of the portal

vein; an extra-hepatic branch of the same; a few branches of the hepatic artery, and the terminal twigs of the right internal mammary of Eng.

FIG. 106.



Internal anatomy of the Siamese twins. (PANCOAST.)

U. Umbilicus. H, H. Hypogastric arteries. Ur, Ur. Urachi. Um, Um. Umbilical veins. L, L. Livers. B, B. Bladders. ii, ii, ii, ii. Internal iliac arteries. P, P. Peritoneal pouches. A, B. Median septum of bond. T. Hepatic structure in bond. D. Diaphragm. E, E. Ensiform cartilages. J, J. Arthrodial joint of same. R, R. Lower costal margin of the thorax.

Extensions from both diaphragms: A broad slip of fibres from Chang passed across the bond and was inserted on the left border of the ensiform cartilage of Eng. A similar, but smaller, band passed in the reverse direction. Two other narrow slips arose from the cordiform tendon of Eng to be inserted dispersedly on the diaphragm of Chang.

The ensiform cartilages were joined by a symphysis and in part by a synchondrosis.[1]

Four operations have been performed for the separation of omphalopagi or xiphopagi.

First Operation.—Under the Roman reign (A. D. 945) two male children were brought from Armenia to Constantinople, well formed in all their extremities, but united by their abdomens. They returned at the commencement of the reign of Constantine VII., and one of them dying, the surgeons undertook to preserve the other by separating him from the corpse. All their skill failed; the second died three days after the operation.

Second Operation.—In 1689, Dr. Fatio successfully separated a xiphopagus by tying ligatures around the bond, which cut through in nine days, when the xiphoid cartilages were severed with a knife. Six months later the children were in good health. (Case reported by Dr. König and by Dr. Zwinger, *Ephemerides*, 1690, Dec. II., An. viii. p. 305; and 1691, Dec. II., An. ix. p. 291.)

Third Operation.—By Dr. Böhm, of Gunzenhausen, who was obstetrician, operator, and father of the twins. An immediate cutting operation was done in the median line, the

[1] For a very full description of the dissection of these bodies the student is referred to the Transactions of the College of Physicians of Philadelphia, 3d series, vol. i. pp. 3–47, Allen; and Pancoast, pp. 149–171.

umbilical vessels on both sides having first been tied. No other ligatures were applied. Three sutures were inserted in each wound, which were removed in three days. The union

FIG. 107.



Marie-Adèle. Separated by an operation.

was mainly primary. One of the children, the feebler of the two, died on the fourth day. The other was nearly five years old when the case was reported.[1]

Fourth Operation.[2]—Marie-Adèle, born June 26, 1881. Oper-

[1] The account of these three cases is taken, abridged, from R. P. Harris, *loc. cit.*

[2] Histoire d'un Monstre Xiphopage, par les Drs. Biaudet et Bugnion. Revue Médicale de la Suisse Romande, vol. ii.

ation, October 9, 1881, by clamps, cutting, and sutures. Adèle died in six hours, Marie in the course of the following day. From the description, the operators do not appear to have had much experience in abdominal surgery.

With the improved technique of abdominal surgery and the observance of asepsis, these operations in the future should be in the main successful, unless there is extensive union, as in some cases, between the stomach and intestines.

DOUBLE PARASITIC MONSTERS.

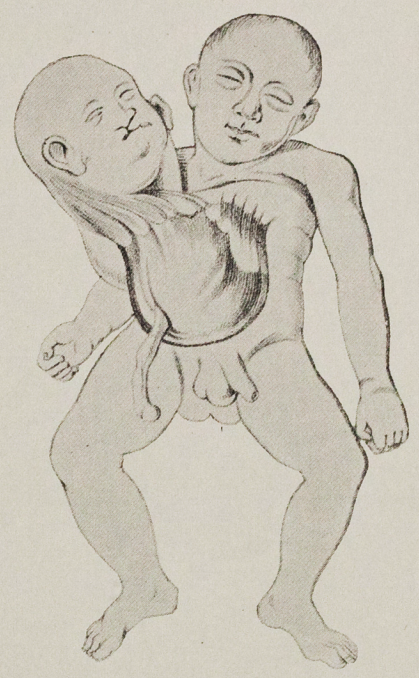
It is convenient, we think, to consider the parasitic forms of double monsters in a separate division, because they often differ so radically in appearance from their symmetrical analogues. We give the definitions of the terms used in the classification of Geoffroy Saint-Hilaire, because they are still employed by almost all French writers and by many English, but, in the description of specimens, we shall follow in the main the same order and shall employ the same nomenclature as in the description of symmetrical double monsters.

HETEROTYPUS.—A parasitic fœtus hangs from the anterior abdominal wall of the principal subject. In heteropagus the parasite has a head and extremities. In heteradelphus the head is wanting. In heterodymus the parasite has a head, neck, and thorax, by which it is implanted in the anterior abdominal wall of its host. Heterotypus and heteroprosopus are terms used in the table of classification, but not explained in the text, of Is. Geoffroy Saint-Hilaire's book.

HETERALIUS.—The parasite is inserted at a distance from the umbilicus of its host, and has no direct connection with the latter's umbilical cord. Epicomus is the only subdivision. In this variety there is an accessory head (craniopagus parasiticus).

POLYGNATHUS.—The parasite is attached to the jaws of its host; in epignathus to the upper, and in hypognathus to lower jaw. By augnathus was probably meant what has the already been described as distomus.

FIG. 108.



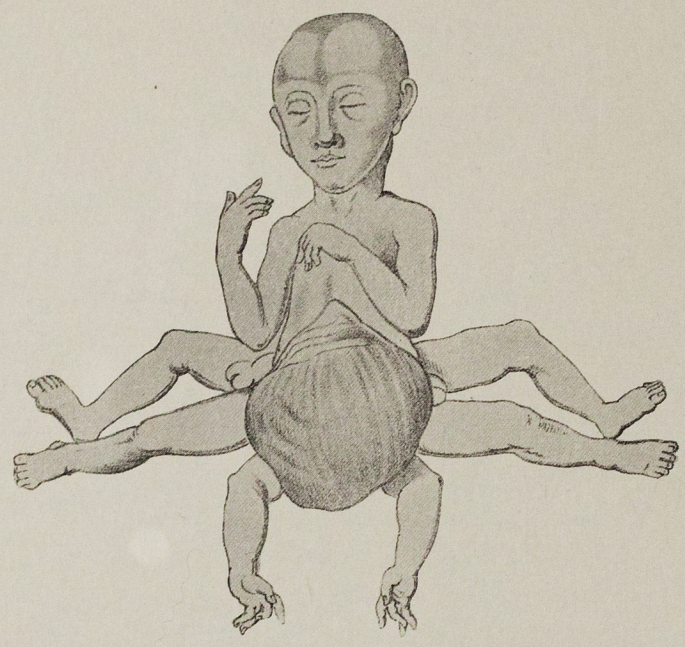
Dicephalus parasiticus. (HESSE.)

POLYMELUS.—There is a duplicity of the lower extremities. As the accessory limbs are inserted in different portions of the host's body, the specimens are named gastromelus, pygomelus, notomelus, cephalomelus, melomelus—terms that are self-explanatory.

ENDOCYMA.—The parasite is included within the skin or body of the host. In the former case the specimen is called dermocyma, in the latter, endocyma. In almost all double parasitic forms the parasite falls behind in development at a

comparatively late period, so that its form is pretty well attained and preserved. There is no heart, or at most a mere rudiment. The parasite is, therefore, nourished by the bloodvessels of its host. Other viscera, however, may present a surprising degee of growth and functional activity. Thus the kidneys and bladder

FIG. 109.



Ischiopagus parasiticus. Front view. (TIEDEMANN.)

of the parasite, in dipygus parasiticus, may perform their functions quite independently of their host.

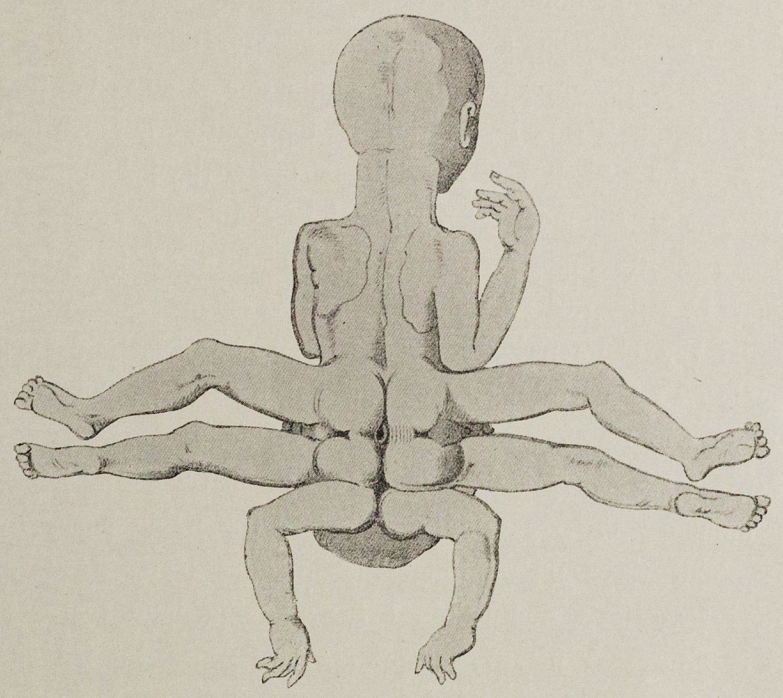
DIPROSOPUS PARASITICUS.—Asymmetrical diprosopus has been described and figured on page 144, Part III., and in Fig. 70. Parasitic forms in the terata katadidyma are very much more rare than they are in the terata anadidyma.

DICEPHALUS PARASITICUS.—In the specimen represented in Fig. 108 there was no connection between the spinal columns of the parasite and host. The former was hydrocephalic, and

possessed a rudimentary heart. In the umbilical cord there was only one artery and one vein.

ISCHIOPAGUS PARASITICUS.—If one of the children in ischiopagus dies in the embryonic stage, it may be nourished by the bloodvessels and heart of the other infant, but its development

FIG. 110.



Ischiopagus parasiticus. Rear view. (TIEDEMANN.)

is, of course, imperfect. In the specimen represented in the illustrations there was a large umbilical hernia involving both abdomens. The parasite had no head or thorax. In the rudimentary representative of the latter was a rudimentary heart.

DIPYGUS PARASITICUS.—This form is much more frequent than the symmetrical duplicity of the lower portion of the body. The parasite may be attached to the mouth, neck, thorax, abdomen, or pelvis of the autosite. The higher the attachment,

as a rule, the better the development of the parasite. Thus, if the insertion is in the thorax of the autosite, the parasite will usually have a thorax, abdomen, pelvis, upper and lower extremities, some development of an intestinal tract, and external genitalia. If the attachment is to the pelvis of the autosite the parasite will be represented by one or two lower extremities, and, perhaps, an additional set of external genitalia. The parasite possesses at most but a rudimentary heart. It is nourished by the vessels of the autosite, but the circulation is so feeble that a pulse cannot, as a rule, be felt, and its temperature is much below normal. In Laloo, it was found to be below the lowest register of the clinical thermometer, 95°; and in Louise L., an exposure of the parasitic limbs so rapidly cooled them as to give the woman herself great discomfort. It is more convenient to describe the characteristics of the class by selecting typical examples. We have selected as such: John Baptist dos Santos, Louise L., and Laloo.

J. B. dos Santos.—Born in 1845. From the pubes hangs a supernumerary lower extremity, united to the pubic bones by a bone about three inches long, the junction being a movable joint. There is a double-joined foot, having nine toes. The tibia is bifurcated below. There are two penes, the left somewhat the larger, which both become erect at the same time, and both discharge semen. There are two scrotums, each with a testicle in it. The thigh and leg are sensitive, but the foot is not. Urine is passed simultaneously through both penes. The man himself declares that there were originally, in the smaller scrotum, which hangs between the two others, two testicles, but that these ascended into the abdomen when he was ten years old. He is said to have considerable virile power.

Louise L., known as "La dame à quatre jambes," was born in 1869. Attached to the pubes is a rudimentary pelvis

and two atrophied legs, the parasite weighing about eight kilos. The attachment is by a pedicle measuring about thirty-three centimetres in diameter, having a bony basis and fixed without

Fig. 111.



John Baptist dos Santos.

Fig 112.



La dame à quatre jambes.

a joint. The vulva in the autosite is displaced far backward toward the anus, almost obliterating the perineum. The parasite has no external genitalia. At the insertion of the parasite are two rudimentary mammæ, one larger than the other. There is no active movement in the parasite. The joints of both limbs

are ankylosed. No pulse can be felt, and the temperature is much below normal. The woman could localize sensations in

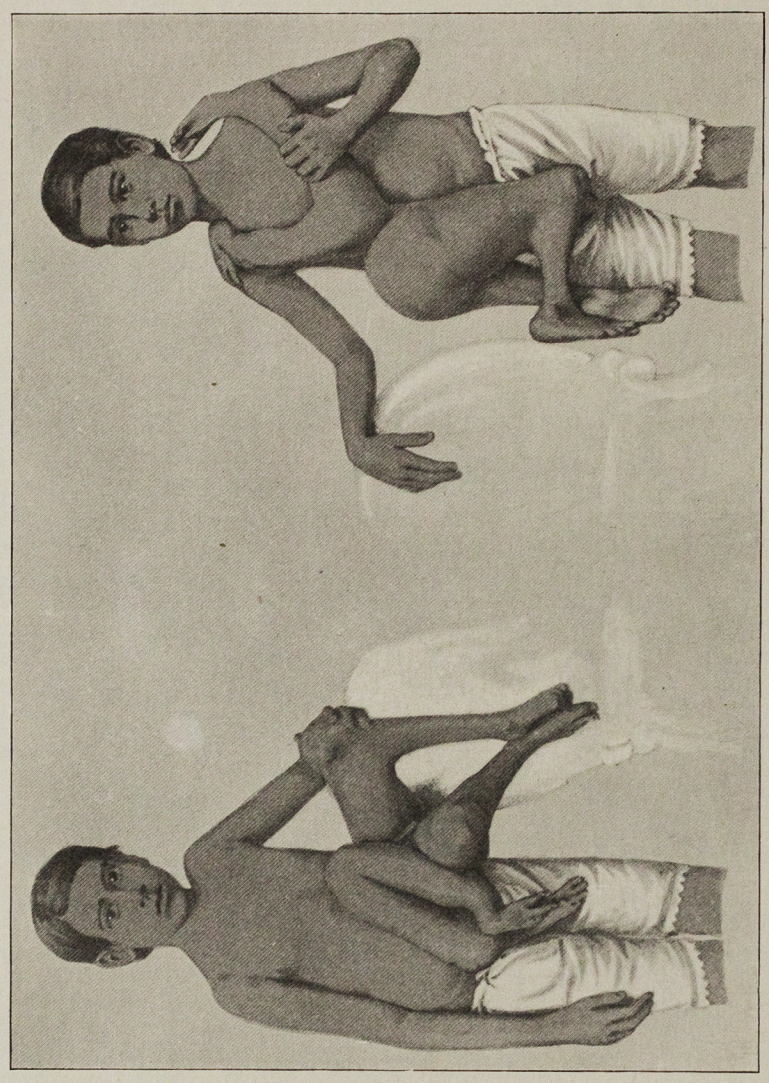


FIG. 113. Laloo.

the parasite, except in the feet. She was married in her fifteenth year, and was delivered, without difficulty, of two well-formed daughters, three years apart.

Laloo, whom we had the opportunity of examining, was

born at Oovon, in Oudh, is now about twenty years of age, and is in good health. He is the second of four children, born of healthy parents, with no history of deformities in the family. The parasite is joined to the thorax and upper abdomen of the autosite; the upper portion of the body being inserted in the thorax by a bony pedicle, the lower by a fleshy pedicle thirteen centimetres in circumference and four centimetres in length, containing intestines. There is a rupture at this situation which is supported by a truss. The anus of the parasite is imperforate, and there are no testicles, but there is a well-formed penis, covered by a luxuriant growth of hair, and set somewhat deep between the thighs, so that it is not at once visible. The manager of the boy takes advantage of this fact to claim that the sex of the parasite is female; and, to arouse the prurient curiosity of the public, the two are described as brother and sister. The parasite is capable of no active motion. Sensation is quite acute, and sharp pinches can be localized everywhere. Urine is passed from the parasite without the knowledge of the boy, and the penis sometimes becomes erect. The temperature of the parasite is low and no pulse can be felt.

Several analogues of Laloo are described in Ahlfeld's work, and in older books on teratology, a well-known example being A-ke, a Chinaman, exhibited in London in the early part of the present century.

In one case a parasite, consisting of a pelvis and lower extremities inserted in the epigastric region of the autosite, was successfully removed by a surgical operation.[1]

Syncephalus Parasiticus.—We put in this class a specimen usually termed Janus symmetros, with regard to the two heads, but as regards the bodies, that on the left in the

[1] Gross: Les Monstres doubles parasitaires. Nancy, 1877, p. 17.

figure (Fig. 114) is certainly enough retarded in its development to be considered parasitic. In another specimen, described by Ahlfeld, the parasitic body consisted of a well-developed head and upper extremities, a short trunk, and one lower extremity.

FIG. 114.

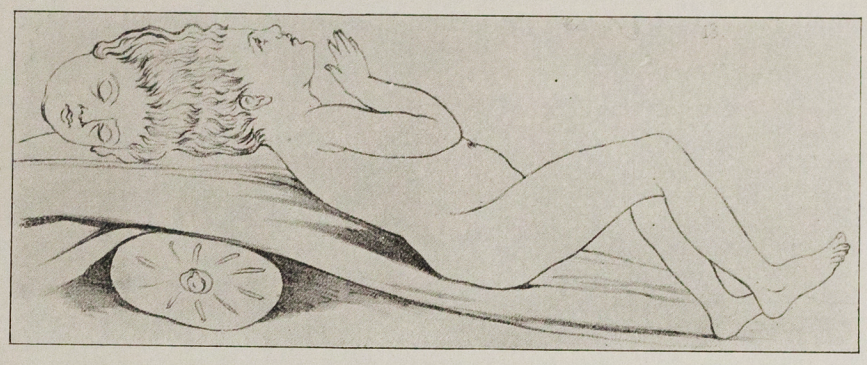


Syncephalus parasiticus.

CRANIOPAGUS PARASITICUS.—In this variety of parasitic monster a supernumerary head is attached to the cranium of the autosite. The former is well developed, but the rest of the body is represented merely by a small mass of flesh. The parasitic head is nourished by the cranial vessels of the autosite. A famous example of this very rare form was described in the *Philosophical Transactions* of 1790. The monster was born in India, in 1783. The midwife was so terrified at its appearance

that she threw it in the fire, but it was rescued and suffered nothing more than some damage to one ear and an eye. The

FIG. 115.



Craniopagus parasiticus.

child lived till the beginning of its fourth year, when it was killed by the bite of a venomous snake. It was said that the parasitic face could somewhat change its expression in sympathy

FIG. 116.

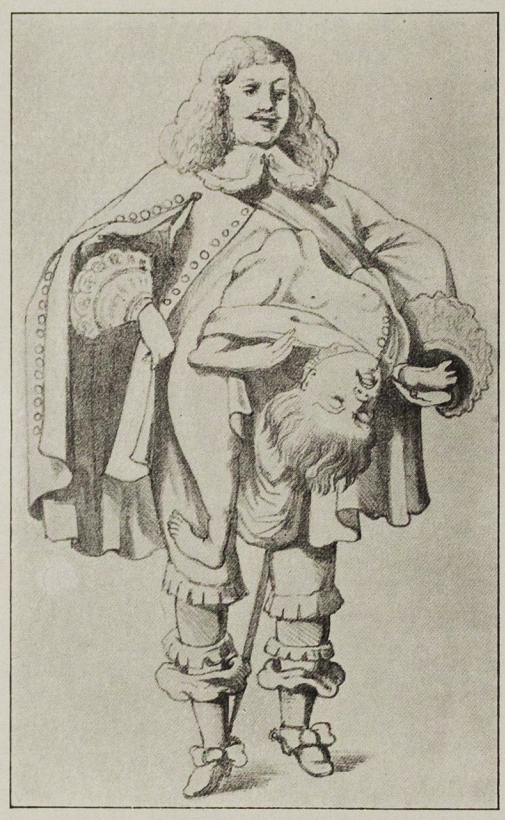


Craniopagus parasiticus.

with the emotions of the autosite. The eyes of the former were never quite closed, but were incapable of intelligent vision, never being fixed on any object. The pupils, however, contracted

under strong light; tears constantly flowed, and the lids had some power of motion. When the child was suddenly awakened both sets of eyes moved. The lower jaw of the parasite had also some motion. There was never a sign of independent intelligence in the parasitic head.

Fig. 117.



Thoracopagus parasiticus.

Thoracopagus Parasiticus.—The parasitic fœtus is attached to the autosite from the ensiform cartilage to the navel. It is nourished entirely by the vessels of the autosite, and possesses no independent circulation. It is, of course, imperfect in growth and development, compared with the autosite. The

best-known example is Lazarus-Johannes Baptista Colloredo, born in Genoa in 1617, who exhibited himself for years in different parts of Europe. There were signs of an independent existence in the parasite. There were the movements of respiration. It was said that there was a thoracic pulse. Saliva flowed from the constantly open mouth. The eyes were always closed. Nothing was ever ingested, nor were there excretions beside the saliva. There was a single lower extremity and the arms ended in imperfectly formed hands.

In addition to this example, Ahlfeld describes two specimens, one sent to him in 1879, the other reported in 1854.

In Plates XXXVIII. and XXXIX. is represented a specimen of this very rare form. Although the parasite is pretty well developed in comparison with the autosite, its parasitic nature is apparent in the illustration, and even more so by an examination of the specimen, which is unfortunately somewhat macerated. Had the infant lived, the autosite would have had a normal growth, while the parasite would very likely have fallen far behind in growth and development—assuming also, in time, by the force of gravity, a different relative position to the autosite, resembling, at length, that in Colloredo. The specimen has been in the museum a long time, and we are unable to find any history of it.

POLYGNATHUS.—Fœtal parts, more or less ill-developed, are attached to the jaws of the autosite. If the lower jaw of the parasite is attached to the lower jaw of the autosite (hypognathus, polygnathus), there has evidently been a simple junction of the two lower branches of the first brachial arches in the early development of two young embryos. If the parasite is attached to the mouth of the autosite, usually to the upper jaw, the hard palate, or to the base of the brain (epignathus), the deformity is much more complex and difficult of explanation.

EPIGNATHUS.—There projects from the mouth of the well-developed autosite a mass, often containing or supporting easily recognizable parts of a fœtal body, but more commonly composed of cysts, cavities, and intervening embryonal tissue of very low development. The covering of the tumor is fairly well developed skin, containing hair-bulbs and sweat-glands, and

FIG. 118.



Epignathus.

covered in part, perhaps, by down. Sometimes the covering of the tumor within the mouth is mucous membrane continuous with that of the mouth.

The contents of the cysts within the tumor is usually a thick fluid, and, in addition, brain substance, skin, epithelium, fat, hair, teeth, cartilage, and bones may be found. Within the tumor there may be detected liver substance, portions of the intestinal tract, cartilage, flat and long bones, especially those of the upper and lower jaw, of the cranium, and of the spinal column. The attachments of the tumor to the mouth are

usually complex, extending possibly through the base of the cranium to the sella Turcica. Or there may be a slender pedicle, as in Hill's case, less than one centimetre in diameter, attached only to the base, sphenoid, and posterior border of the vomer. In this case the tumor projected in part from the anterior nares, and received its blood-supply from a large branch of one of the pharyngeal arteries and from a small branch of the left common carotid, descending through the open pituitary canal from the sella Turcica. It is evident that the blood-supply of these tumors must come from the vessels of the autosite in the mouth or at the base of the brain.

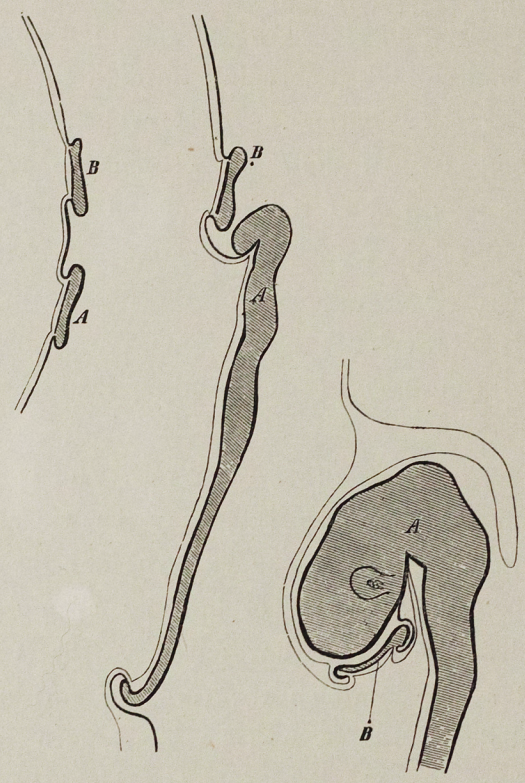
The growth of the parasitic tumor must mechanically affect, to some extent, the development of the regions in the autosite to which it is attached. The interference with normal growth may reach to the base of the skull and to the hypophysis cerebri.

The Origin of Epignathus.—One variety of epignathus, but Ahlfeld claims a very rare one, may be explained by the insertion of the allantois of one embryo into the anterior extremity of the other, instead of into its allantois, as in the ordinary omphalositic or acardiac monster. Baart de la Faille has described a case in which the cords of two acardiaci were inserted in the mouth of a well-developed fœtus, and Rathke has described a specimen in a calf in which the cord of the parasite was inserted in the cranial cavity of the autosite, forming a sort of placenta on the dura mater. In another case the parasite was inserted in the orbital cavity of the autosite. In such cases the nutrition of the parasite must, of course, be very inadequate, and allows only the lowest grade of development known in the fœtus amorphus.

Another mode of origin has been explained by Ahlfeld in an adaptation of Schultze's theory: "We suppose that the

entirely separate embryonic areas lie on a single egg in such a way that the two embryonal axes, the heads of which are turned toward one another, are in the same straight line. The embryos must be sufficiently far apart to allow of their both

FIG. 119. FIG. 120. FIG. 121.



The inclusion of one embryo within the cephalic fold of the other. (AHLFELD.)

rising up on the blastoderm without interfering with one another. Supposing *A* to grow up quickly, while *B* remains small, it follows, provided the distance between the embryos is not too small, that *B* soon comes to lie beneath the anterior cerebral vesicle of *A*, and later still, in the funnel-shaped depression that points at the infundibulum (in which, in the same way, the end of the fore-gut is tucked in), to which it finally becomes attached

by its apex. Thus *B* lies between the posterior layer of the fore-brain and the anterior layer of the fore-gut. With the brain vesicles in front of it, *B* grows in front of the cavity of the fore-gut, and may finally reach and grow fast to the end of the funnel-shaped space, its anterior end being compelled to assume a pointed form, owing to its relation to surrounding parts.

"At the apex of this space is formed the hypophysis cerebri, and here the ends of the fore-gut and cord meet. Thus is explained the connection of the pedicle of the epignathus with the sella Turcica."

It would seem more reasonable to us to attribute a larger number of cases to the implantation of the allantois of the parasite into the anterior extremity of the autosite, regarding the adhesions of the tumor itself to various portions of the mouth as secondary.

Epignathus is a rare deformity. Ahlfeld collected forty references to cases, and three more may be found in our bibliography.

ENDOCYMA.—By this term is meant the more or less complete inclusion of a parasitic fœtus within the body of the autosite. This is brought about in the sacral region by the same process of implantation, according to Schultze and Ahlfeld, that is operative in the production of epignathus. In the large cavities of the body—the abdominal, thoracic, and cranial—the presence of a parasitic embryo is explained by true inclusion, the arching-over process of the walls in the autosite enveloping the parasite within them. Scrotal and perineal inclusion is secondary to abdominal, as the result of gravity and intra-abdominal pressure. Ovarian and testicular inclusion result, perhaps, from the lodgment of the parasitic embryo upon the cell masses destined to form the sexual gland, and its inclusion

by the developing gland. Finally, what Ahlfeld calls fœtal transplantation may be the explanation of a superficial endocyma. In this variety there is an inoculation of cell masses from the parasitic embryo upon the superficial portion of the autosite's body, and the imperfect development of fœtal structures beneath the skin. In the cranial specimens, for example, the transplanted

FIG. 122.



Congenital sacral tumor. (Mütter Museum, College of Physicians.)

embryonal cells develop always outside the dura mater. In endocyma there is a more complex development than is found in dermoid cysts or in the implantation of the cells of the epiderm in the tissues formed from the other layers of the blastodermic membrane. In the first named there have been two distinct embryos. In the last two there is not a multiple impregnation, nor a fission of the germinal area.

Endocyma in the sacral region (sacral teratoma, congenital

sacral tumor) is the connecting link, in form, between double parasitic monsters, like dipygus parasiticus, and complete fœtal inclusion. The tumor is large, and may bear upon it unmistakable portions of a fœtal body, but is more apt to be in structure like the lowest forms of fœtus amorphus, its true nature being only determinable, perhaps, on microscopic examination. In the higher types of congenital sacral tumor, or in the early stages of development, the parasite's coccyx will be joined to that of the autosite, but it is usually impossible to detect this arrangement. The tumor grows beneath the gluteal muscles and upward into the autosite's pelvis, displacing the viscera and pushing the anus and genitalia far forward; or these may lie on the anterior superior portion of the tumor. The parasitic growth is covered in part or entirely by the autosite's skin. In the former case, the junction of the host's skin with the covering of the parasite is plainly visible. In two cases movements have been detected in the tumor from muscular action. (Ahlfeld.)

In abdominal inclusion (*fœtus in fœtu*) the parasitic fœtus may be fairly well formed, but never reaches full development. It may be mummified, as in old abdominal pregnancies. On the other hand, it may be a mass no bigger than one's fist, of lowest development. It is contained in a sac either of connective tissue or of amnionic remnants, adherent to adjacent structures in the abdominal cavity. There may be a remnant of a cord. In one case the parasite, weighing one pound fourteen ounces, was contained in the abdominal wall (*inclusio subcutanea*).

Children with an included fœtus commonly die at or shortly after birth. They are rarely long-lived, though one subject—a man—lived fifty years. Usually the parasite excites peritonitis, and degenerates; the sac suppurates and there is an effort to

discharge fœtal parts by the bowel or through fistulæ in the abdominal wall. Masses of hair and bones have thus been passed, and in one remarkable case (Atlee's) the whole fœtus was discharged from the abdomen of a female child six years old, who lived seventeen years afterward.

In scrotal inclusion the parasitic fœtus, in spite of its disadvantageous position, may reach a surprising degree of development. In one case, after suppuration, there were discharged from a scrotum, a foot, a portion of the upper jaw with four teeth, and a piece of the cranium. (Ahlfeld.)

TRIPLE MONSTERS.

There are only two or three triple monsters recorded. These, and all future specimens, could be grouped in a classifi-

FIG. 123.



Tricephalus.

cation like that for double monsters, with the prefix tri- instead of di-, thus, tricephalus, triprosopus, etc. (Fisher.)

TRICEPHALUS.—Ahlfeld quotes only one authentic case of tricephalus, from Reina and Galvani. The child was born in 1831, after a very difficult labor. The first head was perforated and then amputated; the second perforated, crushed, and then amputated; the third head perforated. There were two spinal columns. On the end of one was one head, on the end of the other, two. The spinal columns were separated to their lower extremities, though the two sacra were joined by cartilage. There were four iliac, two ischiac, and two pubic bones. The thoracic cavities were separated by a thin septum; there was a heart in each. There was a single stomach, and the œsophagus was single to a short distance above, where it divided into two, and one of the branches again divided, so that each head had its own œsophagus. The tracheæ showed a similar arrangement.

In addition to this case, Ahlfeld mentions three others, but they are not entirely credible.

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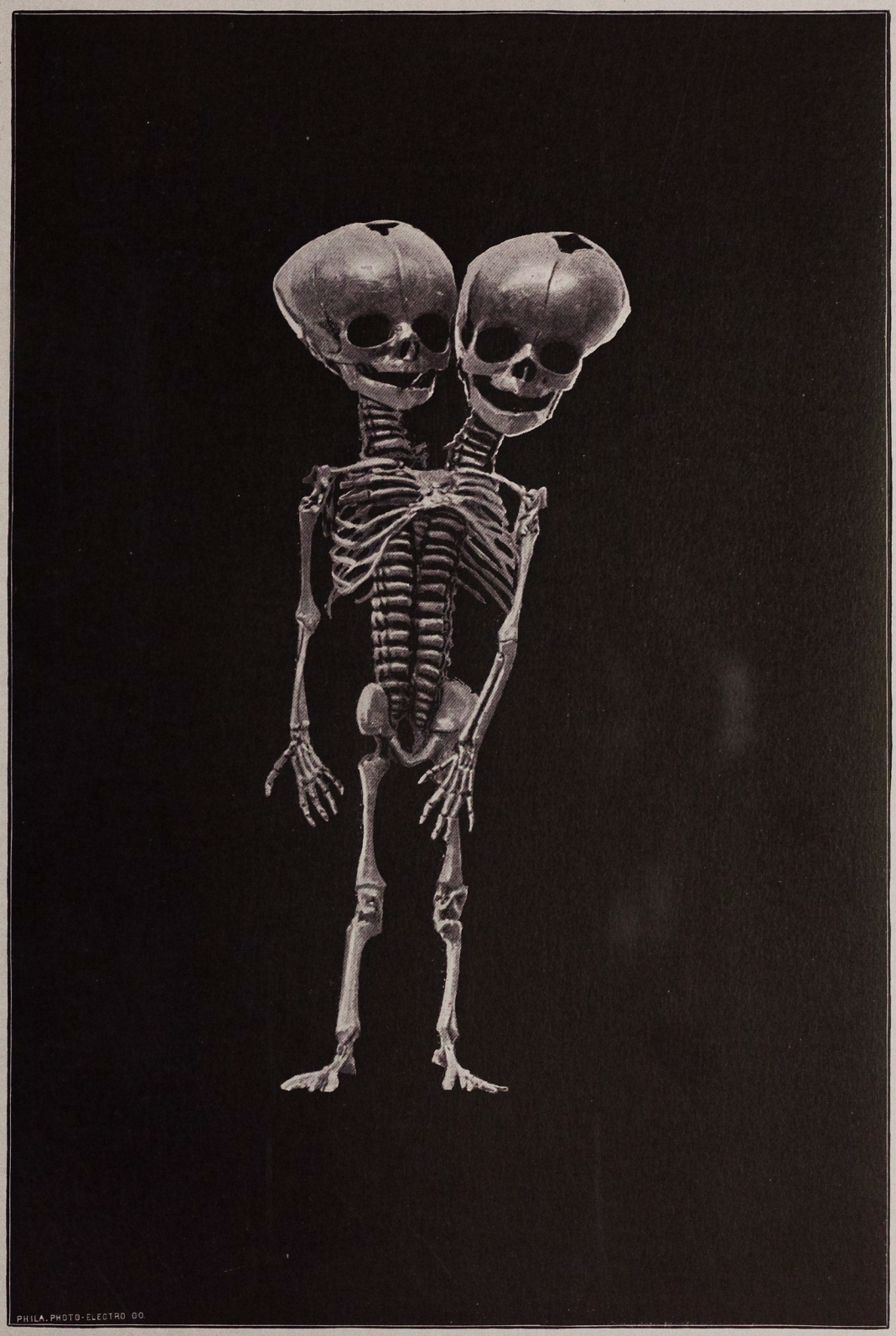
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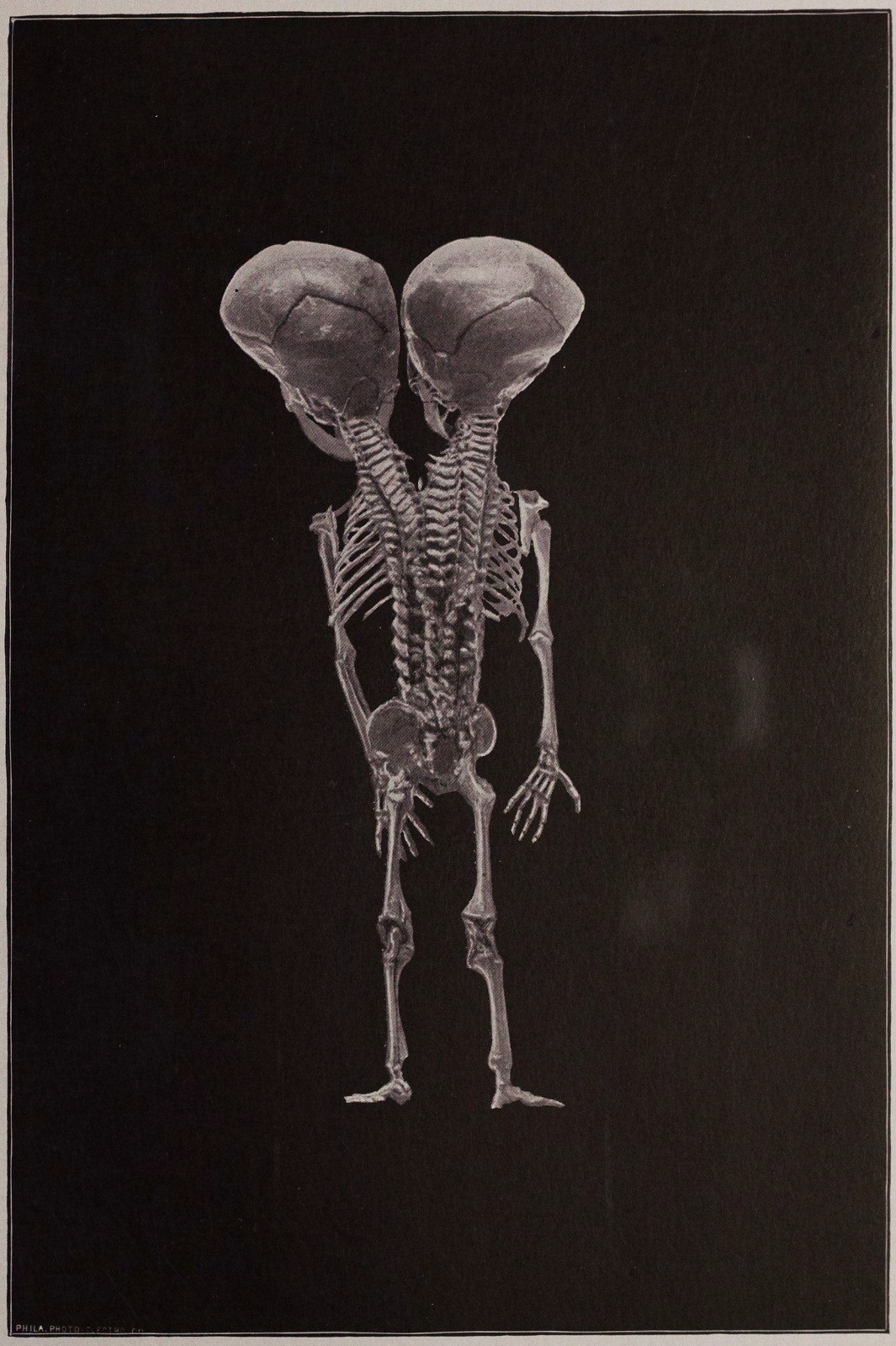
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Plate XXX.



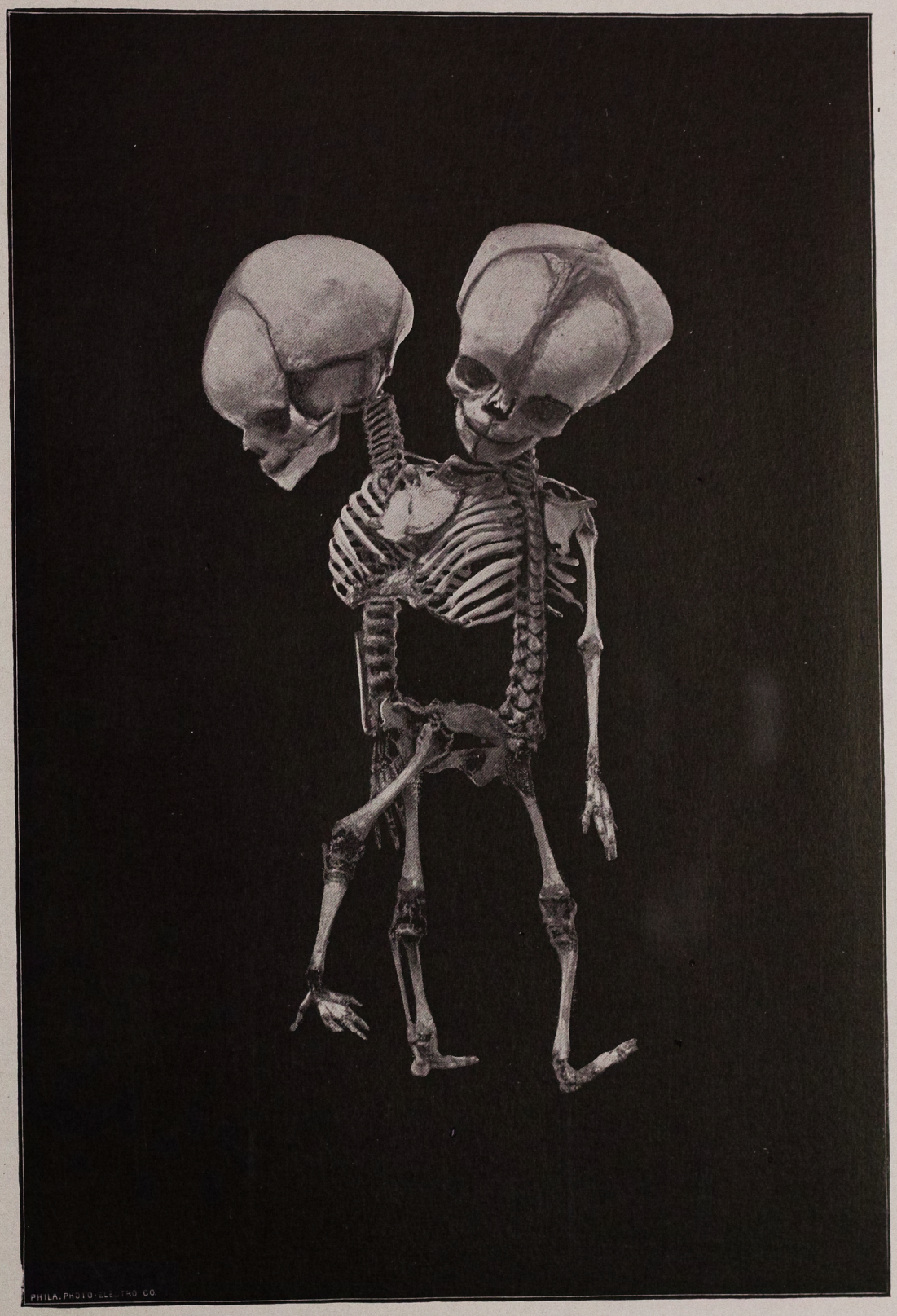
DICEPHALUS DIBRACHIUS DIAUCHENOS.

Plate XXXI.



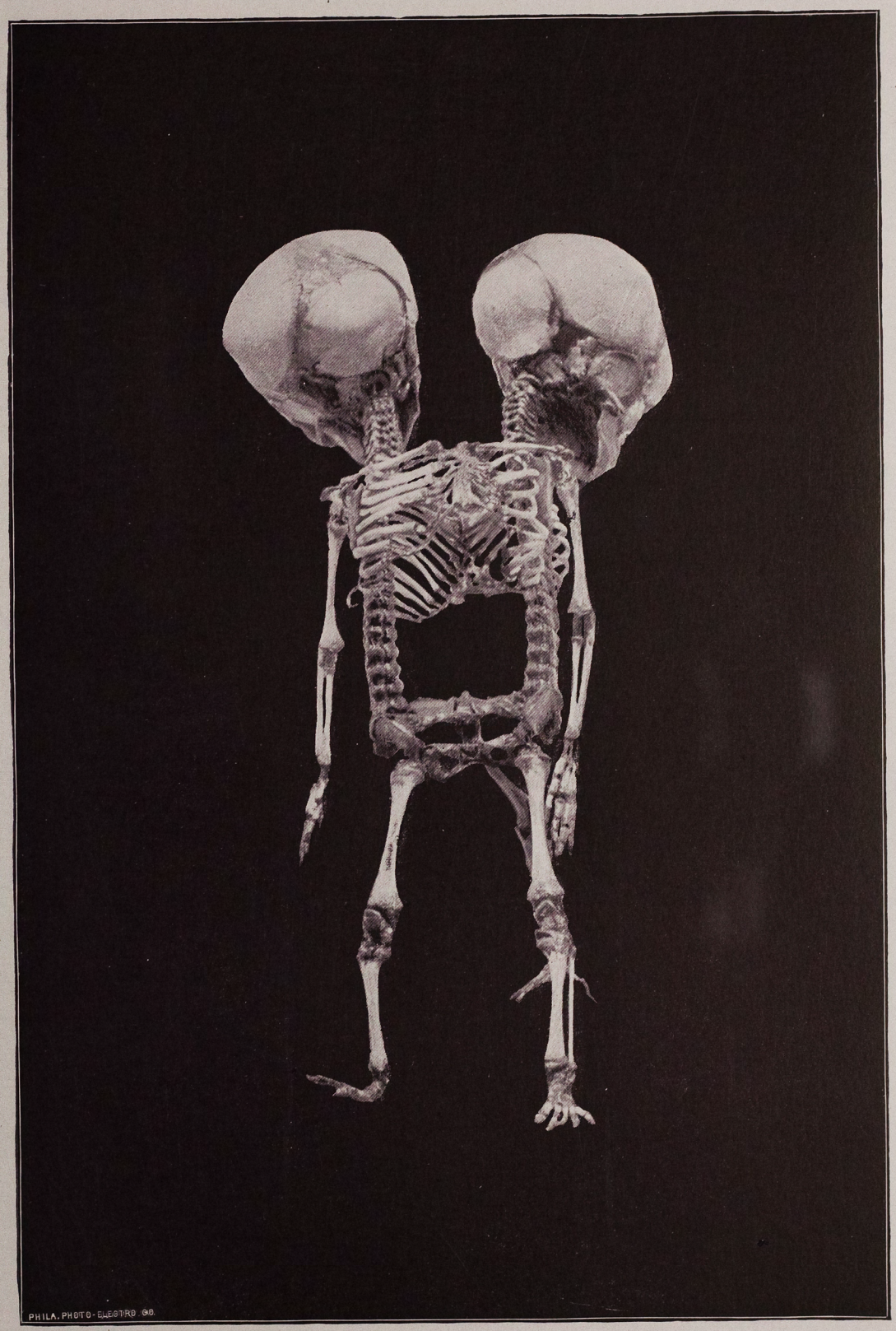
DICEPHALUS DIBRACHIUS DIAUCHENOS.

Plate XXXII.



DICEPHALUS DIBRACHIUS TRIPUS.

Plate XXXIII.



DICEPHALUS DIBRACHIUS TRIPUS.

PLATE XXXIV.



OMPHALOPAGUS.

PLATE XXXV.



OMPHALOPAGUS.

PLATE XXXVI.



OMPHALOPAGUS.

PLATE XXXVII.



OMPHALOPAGUS.



HETEROPAGUS.

FRONT VIEW.

PLATE XXXIX.



HETEROPAGUS.

(REAR VIEW.)